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Why do OECD-countries trade more?

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Abstract

Ineffective institutions increase transaction costs and reduce trade. This paper shows that differences in the effectiveness of institutions offer an explanation for the tendency of OECD countries to trade disproportionately with each other, and with non-OECD countries.

JEL codes: F14, F15

Keywords: bilateral trade, gravity model, institutions, OECD

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1. Introduction

In a recent study, Rose (2003) concludes that membership in the OECD (Organization for Economic Cooperation and Development) has a strong and robust positive effect on trade. He argues that this finding is somewhat of a surprise, because the OECD neither has the formal power to enforce trade liberalization, nor is it exclusively dedicated to the purpose of liberalization. Why, then, do OECD member countries trade disproportionately with each other? In this paper, we argue that the similarity and high quality of institutions of OECD countries provide a plausible explanation for this phenomenon.

Recently, a number of studies estimating gravity models have pointed at the importance of institutions for international trade (e.g., Koukhartchouk and Maurel, 2003, De Groot et al., 2003, Anderson and Marcouiller, 2002). Institutions are formal rules and informal practices devised to reduce the uncertainty in exchange. The quality of institutions affects the transaction costs incurred in trade, explaining the importance of effective domestic institutions for trade (cf. Wei, 2000). We expand on those studies by focusing on the OECD effect and by simultaneously addressing the relevance of the quality and homogeneity of institutions in explaining bilareral trade.

Section 2 introduces our gravity model and the data we have used. Section 3 presents the results and compares our findings to those in Rose (2003). The final section summarizes the main findings of the analysis.

2. A gravity approach to trade with institutions

The gravity model of bilateral trade is a successful tool in empirical accounts of bilateral trade flows. In its basic version, the model describes aggregate bilateral trade as a function of the

economic size of a country-pair and the geographical distance between them. The extended gravity equation that we will estimate looks as follows:

$$\begin{aligned}\ln(T_{ij}) &= \beta_0 + \beta_1 \ln(Y_i) + \beta_2 \ln(Y_j) + \beta_3 \ln(D_{ij}) + \beta_4 Adj_{ij} + \beta_5 Lang_{ij} + \beta_6 PTA_{ij} \\ &+ \beta_7 Religion_{ij} + \beta_8 Col_{ij} + \beta_9 Inst_i + \beta_{10} Inst_j + \beta_{11} SimInst_{ij} + \beta_{12} jointOECD_{ij} \\ &+ \beta_{13} singleOECD_{ij} + \varepsilon_{ij}\end{aligned} \quad (1)$$

where *i* and *j* denote the exporting and importing country. The dependent variable T_{ij} is aggregate merchandise exports from *i* to *j* for 1998. The independent variables are, respectively: national income (*Y*), the distance between *i* and *j* (D_{ij}), and dummies reflecting whether *i* and *j* share: a land border (*Adj*), their primary language (*Lang*), membership in a regional Preferential Trade Agreement (*PTA*), their main religion (*Religion*), and whether they were part of a common colonial empire (*Col*). The variables of particular interest in this paper are two dummies for whether both or only one country in the pair is OECD-member, a variable to capture institutional quality (*Inst*) and a dummy indicating whether both countries share a relatively similar institutional capacity. The final term is the stochastic error term, which captures all other effects on trade, and is assumed to be well-behaved. The gravity model estimates are acquired using OLS.[2]

The data on bilateral merchandise trade are from the UN and taken from the Worldbank WITS interface, accessed on courtesy of the World Bank. Trade between about 9000 country pairs is considered for 1998. Data on institutional quality were collected from the database compiled by Kaufmann et al. (2002). They have combined data on the subjective quality of institutions (for

[2] We have reported the results of specifications that include income per capita in Section 3.3. They yield similar conclusions on the effect of institutions and OECD-membership. In line with Anderson and Marcouiller (2002) and De Groot et al. (2003), the results demonstrate that institutions are the ultimate explanation for the positive relation between the level of development and trade for which GDP per capita is a proxy.

2000-01) into six equally scaled summary-indicators of different aspects of governance. We have taken the sum of the scores on all indicators as an overall score for the level of effectiveness of a country's institutional framework. The mean value for the composite indicator on institutional effectiveness in our country-sample is 0.97, with a standard deviation of 5.02. The indicator is scaled from −15 to +15. Furthermore, we have defined a dummy variable that equals 1 if the absolute difference in institutional quality between countries *i* and *j* is lower than two standard deviations of our indicator. A value of one indicates that the two countries have a similar level of institutional quality. For more more detailed information on the data and variables, see Appendix A.

3. Results

3.1 The effect of institutions

A high effectiveness of institutions in either the exporting or importing country stimulates trade, as can be seen from the benchmark specification in the first column of Table 1. The effect is significant, both statistically and economically. As an indication of the economic importance of effective institutions, we compare an importing country that has institutional quality of one standard deviation above the sample mean with a country that has an average score on institutions. The former will import about 20% more from any third country than the latter.

Separately from the effect of good quality, bilateral difference in the effectiveness of institutions has a statistically significant positive effect on trade as well. Traders from countries that differ considerably in their effectiveness of governance are unfamiliar with each other's level of security in exchange. The business procedures and conventions that they have developed to use their institutional capacity as effectively as possible are not compatible (De Groot et al., 2003). On

the other hand, if institutions are sufficiently similar, familiarity will reduce transaction costs and raise bilateral trade. Homogeneity of institutions increases trade by an estimated 12%.

Table 1. Gravity model specifications; dependent variable: log bilateral export

	Spec. 1	Spec. 2	Spec. 3	Spec. 4
constant	–32.16	–33.10	–32.63	–32.67
	(–62.79)	(–64.59)	(–61.84)	(–61.86)
Log GDP exporter	1.19	1.23	1.21	1.21
	(88.31)	(94.20)	(85.90)	(85.39)
Log GDP importer	0.85	0.87	0.87	0.87
	(64.7)	(71.22)	(63.32)	(63.04)
Log Distance	–1.18	–1.19	–1.20	–1.20
	(–43.45)	(–43.5)	(–44.00)	(–43.76)
Border Dummy	0.66	0.66	0.67	0.66
	(4.74)	(4.66)	(4.77)	(4.74)
Language Dummy	0.25	0.22	0.26	0.25
	(2.33)	(2.05)	(2.42)	(2.38)
Trade area Dummy	0.86	0.97	0.96	0.96
	(9.90)	(10.81)	(10.74)	(10.76)
Religion Dummy	0.53	0.48	0.56	0.55
	(9.92)	(8.86)	(10.32)	(10.28)
Colonial Dummy	0.52	0.59	0.48	0.48
	(5.94)	(6.76)	(5.52)	(5.54)
Governance exporter	0.05		0.07	0.06
	(10.29)		(10.93)	(10.51)
Governance importer	0.04		0.05	0.05
	(7.58)		(8.80)	(8.17)
Governance similarity	0.11			0.12
	(1.91)			(1.73)
Joint OECD membership		0.16	–0.81	–0.77
		(1.29)	(–5.61)	(–5.26)
Single OECD member		0.31	–0.14	–0.08
		(5.91)	(–2.23)	(–1.10)
R^2	0.66	0.65	0.66	0.66
number of observations	9138	9554	9138	9138
F-statistic	1608.83	1799.40	1481.57	1368.13

Note: *t*-statistics are reported in parentheses in the line below the parameter estimates.

3.2 The OECD-effect

In a gravity model without institutions, OECD-membership independently raises trade above the levels we would expect on the basis of these countries' basic characteristics (see Specification 2 in Table 1, cf. Rose, 2003). OECD-membership seems to create more trade with non-members (+36%), than with fellow members (+17%), all else equal. For comparison, Rose's benchmark specification estimates the effect of joint OECD-membership on trade at +55%, and the effect of single membership of the OECD at +49%.[3]

Adding institutional quality to the model turns the otherwise robust effect of OECD-membership on trade completely upside down. The residual effect of OECD-membership on bilateral trade is strongly and statistically significantly negative (Specification 3). It is hard to believe that membership of the OECD negatively influences trade. Still, the effect seems strong enough to argue that it is substantive. The estimated effect of institutions remains significantly positive. This corroborates the hypothesis that OECD countries trade more because of their effective domestic institutions.

In Specification 4, we have also included institutional homogeneity in the gravity model. This does not change the effect of either the quality of institutions, or of joint membership in the OECD on trade. However, the residual effect of single membership on bilateral trade becomes smaller and statistically insignificant. This suggests that low trade between an OECD-member and a non-member is partly caused by the difference in institutional effectiveness.

[3] Rose uses panel data, which generates variation over time as well as across countries. Perhaps the closest comparable specification involves a cross-section estimate for 1995, reported in his Table 2. Like in our results, the effect of joint membership on trade (+46%) is lower than the effect of single membership (+63%).

3.3 Robustness of the results

In this subsection, we address the robustness of the previously shown results. More specifically, we consider the effects of adding income per capita and country-specific fixed effects.

Adding income per capita…

In contrast to Rose (2003), the positive effect of joint OECD-membership is not robust to including income per capita in the gravity equation. A standard gravity equation extended with the effects of OECD-membership and income per capita, is reported in Specification 2 of Table 2. After controlling for their level of wealth, OECD-countries trade disproportionately less with each other, instead of more (cf. the reference specification in column 1 of Table 2, repeated from Table 1). The effect of single membership is still significantly positive at the 10%-level. The difference between our finding, and that of Rose may be caused by several factors. These vary from specification differences to data differences. Also, since the data on institutions are available only on a cross-section basis, we use cross-section data on trade for 1998. Most estimates in Rose (2003) include time series variation as well.

Income per capita itself has a strong and significant, positive effect on bilateral trade. This finding has also been reported frequently in other gravity model studies (see e.g., Frankel, 1997 and 1998). There is no clear theoretical explanation for the positive effect of per capita income. Neither Heckscher-Ohlin theory, nor the preference-based theory of Linder would predict this result. Theories of imperfect competition and trade also do not imply a definite role for income per capita, as opposed to total domestic income (Frankel, 1997: pp. 58-60).

Table 2. Income per capita and fixed effects; dependent variable: log bilateral export

	Spec.1	Spec.2	Spec.3	Spec.4	Spec.5	Spec.6
constant	–33.10	–34.48	–31.50	–31.56	15.80	15.97
	(–64.59)	(–63.35)	(–51.11)	(–51.15)	(32.94)	(33.13)
Log GDP exporter	1.23	1.18	1.22	1.22		
	(94.20)	(79.17)	(79.25)	(78.86)		
Log GDP importer	0.87	0.84	0.88	0.88		
	(71.22)	(57.98)	(57.59)	(57.35)		
Log GDP/cap exporter		0.19	–0.11	–0.11		
		(6.67)	(–2.51)	(–2.52)		
Log GDP/cap importer		0.15	–0.08	–0.08		
		(5.34)	(–1.76)	(–1.75)		
Log Distance	–1.19	–1.16	–1.21	–1.20	–1.43	–1.45
	(–43.50)	(–42.29)	(–44.19)	(–43.92)	(–42.71)	(–42.70)
Border Dummy	0.66	0.69	0.64	0.63	0.53	0.46
	(4.66)	(4.94)	(4.59)	(4.57)	(4.25)	(3.72)
Language Dummy	0.22	0.19	0.24	0.23	0.39	0.38
	(2.05)	(1.69)	(2.19)	(2.12)	(3.87)	(3.71)
Trade area Dummy	0.97	0.94	0.94	0.94	0.60	0.53
	(10.81)	(10.68)	(10.65)	(10.67)	(6.65)	(5.84)
Religion Dummy	0.48	0.46	0.51	0.51	0.60	0.63
	(8.86)	(8.54)	(9.52)	(9.48)	(11.94)	(12.58)
Colonial Dummy	0.59	0.68	0.49	0.49	0.53	0.47
	(6.76)	(7.43)	(5.40)	(5.44)	(5.89)	(5.19)
Governance exporter			0.09	0.09		
			(9.96)	(9.73)		
Governance importer			0.07	0.07		
			(7.96)	(7.57)		
Governance similarity				0.13		0.30
				(1.98)		(4.54)
Joint OECD membership	0.16	–0.23	–1.01	–0.96	9.52	9.39
	(1.29)	(–1.74)	(–6.99)	(–6.60)	(20.54)	(20.34)
Single OECD member	0.31	0.11	–0.24	–0.17	5.08	5.11
	(5.91)	(1.91)	(–3.76)	(–2.34)	(22.00)	(22.29)
adjusted R^2	0.65	0.66	0.67	0.67	0.74	0.74
number of observations	9554	9006	8715	8715	9652	9234
F-statistic	1799.40	1487.82	1280.18	1195.49	117.18	118.55

Note: *t*-statistics are reported in parentheses in the line below the parameter estimates.

...and institutions

Our estimates in Specifications 3 and 4 show that the effect of income per capita itself is not robust to the introduction of institutions. When both are included, per capita income turns out to have a significantly negative effect on trade (at the 10%-level at least), whereas quality and similarity of institutions still positively affect trade. OECD-membership again depresses trade, both with other OECD-countries and with non-members. The trade effects of institutions and OECD-membership are significant at the 5%-level at least.

We find that institutions are dominant in explaining why rich countries trade more in general and OECD-countries in particular. After controlling for the effectiveness of institutions, rich countries have lower trade than expected, and OECD-countries trade even less. Anderson and Marcouiller (2002) argue that excluding institutional effectiveness from the gravity model can obscure a negative relation between income per capita and trade in merchandize, because of the high correlation between per capita income and the quality of governance. The negative influence of development on trade reflects a negative relation between the share of expenditure on traded merchandize and GDP per capita. This results from a shift in the structure of production and consumption, from commodities into services.

Controlling for non-observed heterogeneity

The two final columns of Table 2 present specifications that test the robustness of the bilateral dummy variables to country-specific fixed effects. These gravity equations include dummy variables for each country, both as exporter and importer. Since we have used the two OECD dummies to identify the bilateral trade relations including at least one OECD member, we cannot separately identify individual country-specific effects for all OECD countries. We have to omit the country-specific dummies for one OECD country to avoid multi-collinearity. Apart from this, the

models are estimated with a full set of dummies. The dummy variables represent all country-specific factors that might be relevant for their propensity to trade, either in the role as exporter or as importing country. Specifications 5 and 6 show that OECD countries continue to trade more, both between each other and with non-OECD countries.[4] The OECD effect is robust to country-specific idiosyncrasies, which supports the argument that the relation found is not spurious, but reflects an underlying pattern. Specification 6 also illustrates that institutional similarity is not the most important explanation for the disproportionate trade of OECD countries. Thus, the results of Table 2 are in line with the conclusion based on the results reported in Table 1. Variation in the effectiveness of institutions ultimately explains the high relative trade of OECD countries.

4. Conclusions.

Member countries of the OECD trade more than standard gravity variables can explain. This paper has shown that variation in the quality of domestic institutions explains why OECD-countries are relatively attractive trade partners. Institutions that are effective in the defense of property rights decrease the insecurity of international transactions, and lower transaction costs. As a result, bilateral trade is more beneficial. If we include measures of institutional effectiveness in an otherwise standard gravity model, they turn out to be positively and significantly related to bilateral trade flows. The residual effect of OECD-membership on bilateral trade with both a fellow OECD-country and a non-OECD country is significantly negative. The results underline the relevance of investing in good governance in order to increase the potential to benefit from international trade. Acknowledging the benefits of effective institutions, we are left with a

[4] The high parameter estimates for OECD-membership, as compared to our earlier findings, are explained by the use of country-fixed effects. The coefficients should be interpreted in conjunction with the estimated country-specific fixed effects. This also explains the sign reversal in the constant term.

question opposite to the title of this paper, viz. 'Why do OECD countries trade less than we would expect?'

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Appendix A. Description of data

In the empirical analysis, we make use of both country-specific and bilateral data from various sources. Gross domestic product for exporting and importing countries are examples of country-specific variables. Geographical distance, adjacency, main language and religion, amongst others, are examples of other characteristics that we take into account for each pair of countries. We will now describe the data in more detail.

- We use bilateral exports as dependent variable, such that each country pair yields two observations, with either country as exporter or importer. We have used UN data on bilateral trade flows in 1998, for a set of more than 100 countries. The figures focus on merchandise trade only.
- For information on the level of GDP and GDP per capita, data from the World Development Indicators (WorldBank 2000, on CD Rom) were used for 1998.
- For institutional quality, we have used the most recent and comprehensive data-set on the quality of governance available. This database was constructed for the World Bank by Kaufmann et al. (2002). Indicators from 17 different sources, constructed by 15 organisations have been combined. The data-set consists of six indicators of perceived institutional quality. Each indicator captures some related aspects of the quality of governance. They either reflect the political process, the quality of the state apparatus and its policies, or the success of governance. We discuss these indicators in turn:
    - ‘Voice and Accountability’ reflects the extent to which citizens can participate in selecting government and hold her accountable for the actions taken. This score includes various characteristics of the political process as well as assessments of the independence of the media. It reflects whether citizens and business can prevent

arbitrariness in the behaviour of government and enforce good governance when needed.

- ‘Political Stability’ refers to the perceived likelihood of the government being destabilised or overthrown by unconstitutional interference or excesses of violence against persons and possessions. These factors are highly detrimental for the continuity of policy and the stability of the economic environment.
- ‘Government Effectiveness’ is a measure for the quality of government inputs. It represents, amongst others, the perceived quality and independence of the bureaucracy. This indicates the ability of government to formulate and implement good policies.
- ‘Regulatory Quality’ is directly focused on the quality of implemented policies. It includes the perceived incidence of policies that inhibit the market mechanism, and excessive regulation of foreign trade and business development and as such closely reflects the transaction costs that result from policy intrusion by the state in private trade.
- ‘Rule of Law’ indicates the quality of the legal system. It indicates society’s perceived success in upholding fair and predictable rules for social and economic interaction. Essentially, it focuses on the quality of the legal system and the enforceability of contracts.
- ‘Control of Corruption’ represents the extent of ‘lawless’ or unfair behaviour in public-private interactions. It complements regulatory quality and rule of law indicators, pointing at the impact of bad governance on economic interaction. Corruption, like regulatory intrusion, affects transaction costs by adding a ‘third-

party' involvement to private transaction. An added component of corruption to trading costs is its arbitrary, uncertain nature.

- The data on geographical distance, common border, common primary language, common trade agreement, common dominant religion and common colonial history have been collected from diverse sources, such as the data-set used by Sala-i-Martin (1997)[5], for religions and colonial backgrounds, and John Haveman's International Trade Data for distance, language and contiguity.[6] This part of our database is available upon request from the corresponding author. Some remarks on these variables are in place:
    - Many costs of trade are related to geographical distance, from physical transport costs of goods and persons to the costs of cultural unfamiliarity. As conventional in the literature, geographical distance has been measured as the distance from home to foreign 'as the bird flies', using the principal city of each country as its centre of gravity. This implies that the distance between the two centres of gravity of neighbouring countries is likely to overestimate the average distance of trade between them. The argument that the distance measure used leads to an overestimate of the distance of trade holds true for all pairs of countries. However, its relative impact is much larger in neighbouring countries than in countries that are far away from each other. Not all countries in our dataset were represented in the database for bilateral distances. For these countries, proxies were constructed using distances from neighbouring countries that were included in the database. For more discussion of the use and usefulness of other, more sophisticated measures of geographical distance, see Frankel (1997, chapter 4). In general, more sophisticated

[5] www.columbia.edu/~xs23/data.htm.
[6] www.macalester.edu/research/economics/PAGE/HAVEMAN/Trade.Resources/TradeData.html#Gravity.

measures do not change the estimation results much, and cannot eliminate the measurement error for contiguous countries either.

- The common land border dummy indicates whether two countries are adjacent. Measurement error in the distance variable, as well as the effect of historical relations between adjacent countries are captured by this dummy-variable. For countries in our data set that had no adjacency data available from the main source, the CIA factbook (www.cia.gov/cia/publications/factbook) was used to determine whether they shared borders with any other country in the dataset.
- To assess commonality in primary language, we used a database that distinguished fourteen languages: Arabic, Burmese, Chinese, Dutch, English, French, German, Greek, Korean, Malay, Persian, Portuguese, Spanish and Swedish. In case none of these applied or no data were available, the categories 'other language' and 'non available' were assigned. Using the CIA factbook, these countries have been checked. A dummy variable reflects whether or not two countries have the same primary language, an important aspect of cultural similarity.
- Whether pairs of countries take part in common trade agreements has been assessed using WTO data on major regional integration agreements. A dummy variable (common trade bloc) indicates whether a pair of countries enters into at least one common regional Preferential Trade Agreement.
- Cultural and/or historical ties between countries may also consist of a common dominant religion or a shared colonial past. Data for religion and colonial background have been taken from Sala-i-Martin (1997). Percentages of the population that adhere to one of seven major religions are presented. These religions are: Buddhism, Catholicism, Confucianism, Hinduism, Jewish religion,

Islam, and Protestantism. For some countries, two religions were equally dominant over the others. These countries entered into the analysis with both religions as dominant religion. Commonality of dominant religion implies a value of 1 for the dummy variable ‘common religion’.

- The dummy variable ‘common colony’ reflects for each pair of countries whether both of them share a similar colonial history. The data considered the British, French and Spanish empires only. We also included the colonizers themselves into the respective empires, contrary to the original source. In this way, the figures identify shared colonial relations for pairs of countries.